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Beneficial Use of Tire Shreds in Civil Engineering Applications

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- Represents the 8 US tire manufacturers
  - 90% tires sold in the USA
- Created scrap tire program in 1990
- Focus on development of sound markets and management for 100% of annually generated scrap tires
- Elimination of all scrap tire piles in an environmentally and economically sound manner

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RMA Tire Company Members

BRIDGESTONE AMERICAS

Continental Tires Engineered in Germany

COOPERTIRES

GOODYEAR

MICHELIN

PIRELLI

TOYOTIRES

YOKOHAMA

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The Use of Tire Shreds in Civil Engineering

- Defined as the use of scrap tires, usually shredded, in lieu of conventional construction materials
- A substitute for gravel, sand, light-weight fill materials
- Today referred to as tire-derived aggregate (TDA)

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The Use of Tire Shreds in Civil Engineering

- Civil engineering applications began in late 1980's
- First used in road construction
- Construction guidelines developed ('96)
- ASTM Standards developed ('97)
- Extensive leachate testing conducted

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Tire Shreds?

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Why Use Tire Shreds?

- Tire shreds have properties that civil engineers need
  - Lightweight (1/3 weight of soil)
  - Low earth pressure (1/2 of soil)
  - Good thermal insulation (8 times better soil)
  - Good drainage (10 time better than soil)
  - Compressible

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Why Use Tire Shreds?

- Light weight and low earth pressure are very beneficial where there is poor soil structure
  - Weak foundation soils
  - Increase slope stability
  - Reduce settlement
  - Landslide stabilization

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Why Use Tire Shreds?

- Tire shreds can improve engineering performance
- Tire shreds are often the least cost alternative if you need their unique properties

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Civil Engineering Applications

- Lightweight fill for highway embankments
- Retaining wall backfill
- Insulation to limit frost penetration
- Septic field drainage medium
- Vibration attenuation for rail lines
- Future - earthquake damping

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Civil Engineering Applications

- Drainage material in landfills
- Backfill in gas venting systems
- Alternative daily cover
- Liners for certain types of landfills
- Landfill cap closure material

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Civil Engineering Applications in the United States

- Went from >1 million in 1992 to 53 million in 2003
- Approximately 48 million tires were used in 2005
- Large-scale end use for tires: good market for abatement tires

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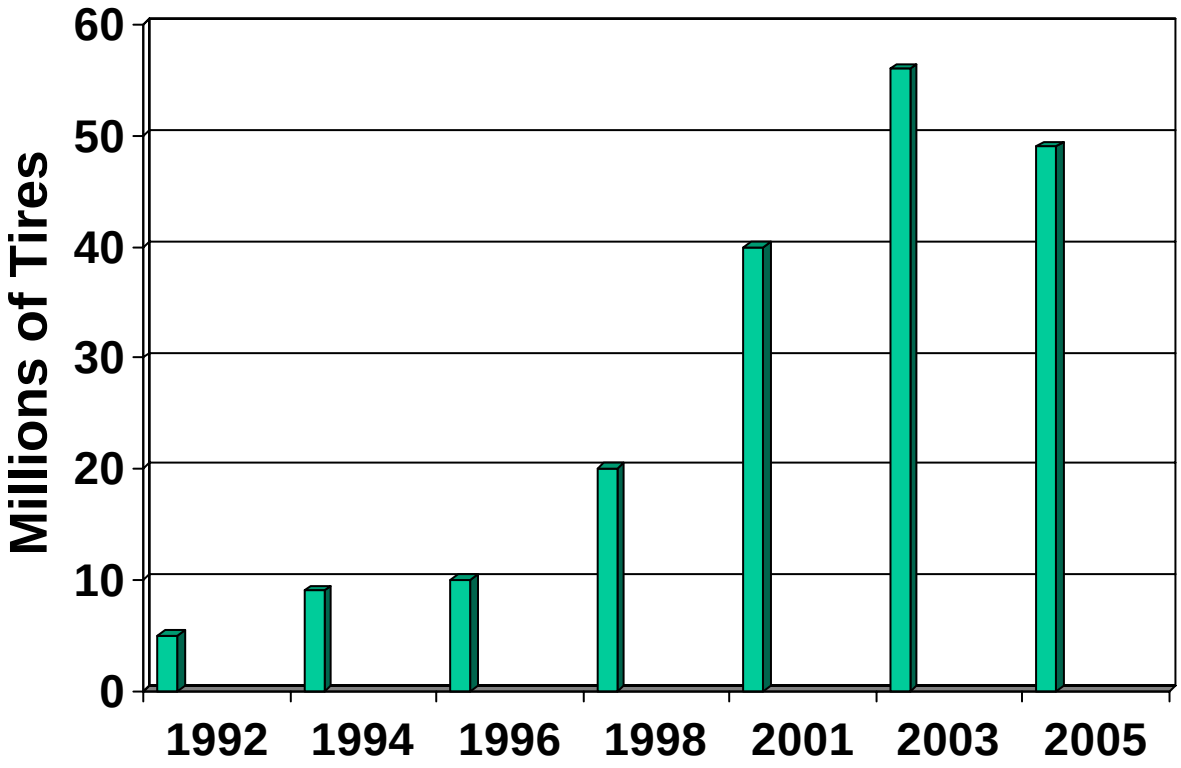
CE Markets Over Time



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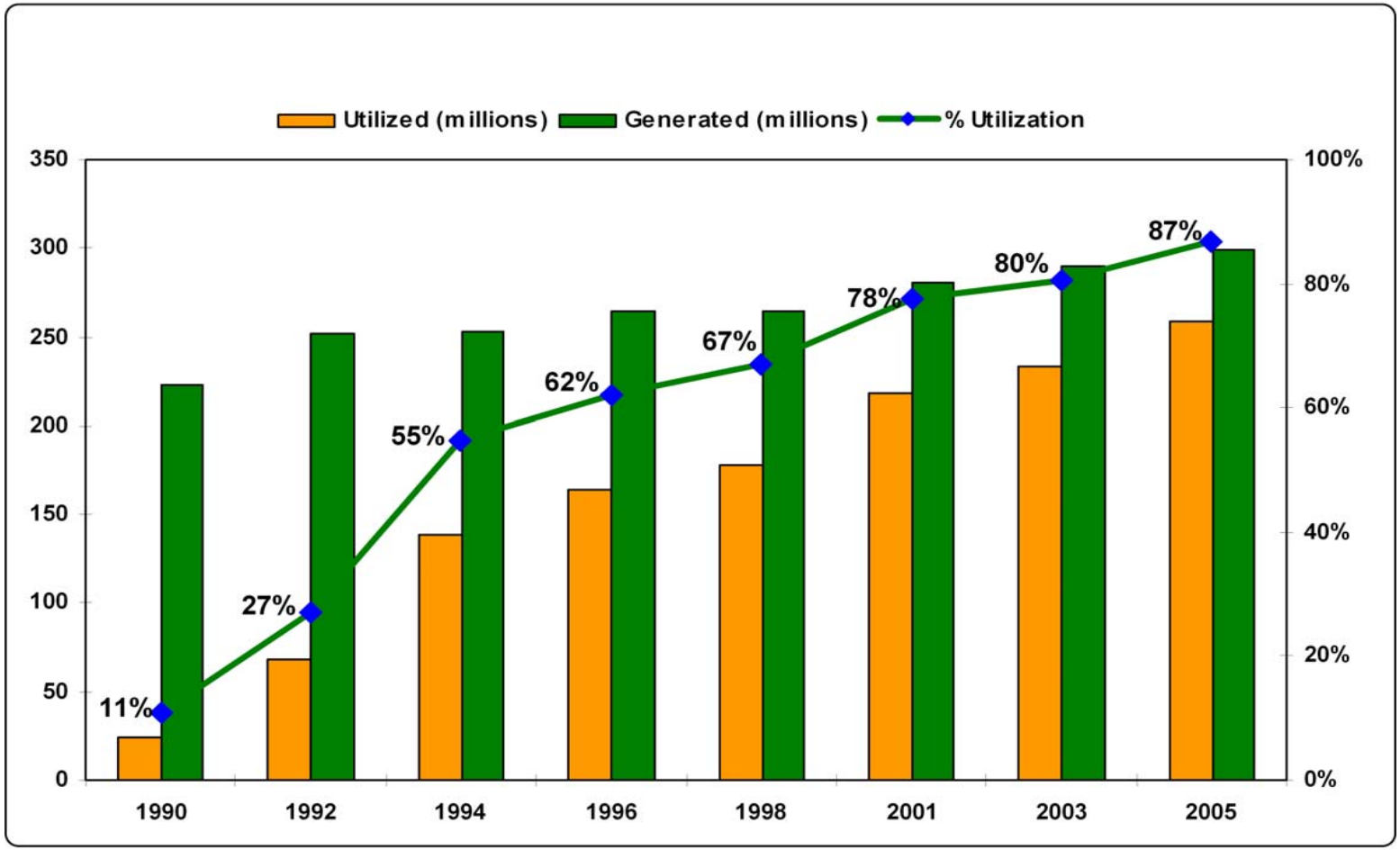
U.S. Scrap Tire Management Trends, 1990 - 2005



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Technical Resources

- RMA has 120 reports on website and in files
- University of Maine and EPA also have reports on web
- Leachate studies above and below groundwater table are available on web
- ASTM specification available
- Training courses available

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Leachate from Tire Shreds Above/Below Water Table

- Primary drinking water standards
  - No effect
- Secondary drinking water standards
  - Manganese & iron
  - Not significant
- Organics
  - No effect

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Obstacles

- State regulatory agency's definition of scrap tires as a solid waste
  - Use of tire shreds would require additional permit
  - Solid wastes can not contact groundwater
- State policy discourages or bans this use
  - Non-elected official making a decision (MI)
- Short construction season
  - Processor needs to shred & store +1 year's worth of TDA; logistical problems

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Obstacles

- No regulations for storing shreds on construction site
- State does 1 CE project and declares victory: Been there/Done that
- DOT satisfied in doing 1 project w/shreds at a time
- Long-term planning process limits use of shreds

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Recommendations

- Develop better communications with construction industry
- Obtain comprehensive list of state regulations on use of TDA
- Provide information to state & Federal market development programs
- Prepare answers for all questions

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Conclusions

- Tire shreds have properties that engineers need
- Tire shreds are cost effective
- Specifications and guidelines exist
- Good market for large-scale numbers of tires
- Good use for abatement tires

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Conclusions

- No unresolved/significant environmental problems
- Can resolve local scrap tire problems
- Interagency cooperation is key to success
- Long-term planning is needed
- States need to review and modify their policies before all states can use tire shreds in beneficial applications

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QUESTIONS?